

In the claims:

Please amend the claims as follows:

1. (Currently amended): A light-radiating semiconductor component, comprising:
 a semiconductor body emitting electromagnetic radiation during an operation of
 the semiconductor component, said semiconductor body having a semiconductor
 layer sequence suitable for emitting electromagnetic radiation of a first wavelength range
 selected from a spectral region consisting of ultraviolet, blue, and green;
 a first electrical terminal and a second electrical terminal each electrically
 conductively connected to said semiconductor body;
 a luminescence conversion element with at least one luminescent material, said
 luminescence conversion element converting a radiation originating in the first
 wavelength range into radiation of a second wavelength range different from the first
 wavelength range, such that the semiconductor component emits polychromatic radiation
 comprising radiation of the first wavelength range and radiation of the second
 wavelength range;
 said luminescence conversion element comprising a luminescence conversion
layer produced from a silicone and containing inorganic luminescence material selected
from the group consisting of garnets doped with rare earths, alkaline earth metal sulfides
doped with rare earths, thiogallates doped with rare earths, aluminates doped with rare
earths, and orthosilicates doped with rare earths.

- 7 P. 2345
(Currently amended): The semiconductor component according to claim 1, 18, 25, 26, 52
or 53 wherein said luminescence conversion element layer converts radiation of the first
wavelength range into radiation of a plurality of second wavelength ranges from mutually
different spectral subregions, such that the semiconductor component emits
polychromatic radiation comprising radiation of the first wavelength range and radiation
of the plurality of second wavelength ranges.

8. (Currently amended): The semiconductor component according to claim 1, 13, 25, 26, 52 or 53, wherein the semiconductor component has a defined main radiating direction, and said luminescence conversion element layer is disposed substantially downstream of said semiconductor body in the main radiating direction of the semiconductor component.

9. (Currently amended): The semiconductor component according to claim 1 13, wherein said luminescence conversion element is at least one luminescence conversion layer disposed in a vicinity of said semiconductor body.

10. (Currently amended): The semiconductor component according to claim 1 13, wherein said luminescence conversion element is a luminescence conversion encapsulation enclosing at least a part of said semiconductor body and partial regions of said first and second electrical terminals.

11. (Currently amended): The semiconductor component according to claim 1 25 or 26, wherein said second wavelength range includes wavelengths at least some of which are longer than wavelengths of the first wavelength range.

12. (Currently amended): The semiconductor component according to claim 1 25 or 26, wherein said semiconductor body is adapted to emit ultraviolet radiation during operation of the semiconductor component, and said luminescence conversion element converts at least a portion of the ultraviolet radiation into visible light.

13. (Currently amended): The semiconductor component according to claim 1 25 or 26, wherein the first wavelength range and the second wavelength range of the polychromatic radiation lie at least partially in mutually complementary-color spectral regions, and a combination of radiation from the first and second wavelength range results in white light.

14 (Currently amended): The semiconductor component according to claim 2 25 or 26,
wherein said luminescence conversion element converts radiation of the first wavelength
range into radiation of a plurality of second wavelength ranges from mutually different
spectral subregions, such that the semiconductor component emits polychromatic
radiation comprising radiation of the first wavelength range and radiation of the plurality
of second wavelength ranges, wherein the first wavelength range emitted by said
semiconductor body and two second wavelength ranges produce an additive color triad,
such that white light is radiated by the semiconductor component during operation
thereof.

15 (Currently amended): The semiconductor component according to claim 4 25 or 26,
wherein the radiation emitted by said semiconductor body has a luminescence intensity
maximum in a blue spectral region at a wavelength ~~selected from the group consisting of~~
~~l=430 nm and l=450 nm~~ between 420 nm and 460 nm.

16 (Currently amended): The semiconductor component according to claim 4 25 or 26,
which further comprises an opaque base housing formed with a recess, and wherein said
semiconductor body is disposed in said recess of said base housing, and including a
covering layer having a luminescence conversion layer on said recess.

17 (Currently amended): The semiconductor component according to claim 4 25 or 26,
which further comprises an opaque base housing formed with a recess, and wherein said
semiconductor body is disposed in said recess of said base housing, and wherein said
recess is at least partially filled with said luminescence conversion element.

18 (Currently amended): A light-radiating semiconductor component, comprising:
a semiconductor body emitting electromagnetic radiation during an operation of the
semiconductor component, said semiconductor body having a semiconductor layer
sequence suitable for emitting electromagnetic radiation of a first wavelength range
selected from a spectral region consisting of ultraviolet, blue, and green;

a first electrical terminal and a second electrical terminal each electrically conductively connected to said semiconductor body;

a luminescence conversion element with at least one luminescent material, said luminescence conversion element converting a radiation originating in the first wavelength range into radiation of a second wavelength range different from the first wavelength range, such that the semiconductor component emits polychromatic radiation comprising radiation of the first wavelength range and radiation of the second wavelength range. The semiconductor component according to claim 1, wherein said second wavelength range includes wavelengths at least some of which are longer than wavelengths of said first wavelength range, and said luminescence conversion element comprises a plurality of layers with mutually different wavelength conversion properties.

18
14. (Currently amended): The semiconductor component according to claim 1 13, 25 or 26, wherein said luminescence conversion element includes organic dye molecules in a plastic matrix.

19
15. (Currently amended): The semiconductor component according to claim 1 13, 25 or 26, wherein said luminescence conversion element includes organic dye molecules in a plastic matrix, and wherein said plastic matrix is formed from a plastic material selected from the group consisting of silicone, thermoplastic material, and thermosetting plastic material.

20
16. (Currently amended): The semiconductor component according to claim 1 13, 25 or 26, wherein said luminescence conversion element includes organic dye molecules in a plastic matrix, and wherein said luminescence conversion element has organic dye molecules in a matrix selected from the group consisting of an epoxy resin matrix and a polymethyl methacrylate matrix.

21. (Currently amended): The semiconductor component according to claim 17 ~~13, 25 or 26~~, wherein said luminescence conversion element has at least one inorganic luminescence material selected from the phosphor group.

22. (Currently amended): The semiconductor component according to claim 17 ~~13, 25 or 26~~, wherein the inorganic luminescent material is selected from the group of Ce-doped garnets.

23. (Currently amended): The semiconductor component according to claim 18 ~~13, 25 or 26~~, wherein the inorganic luminescent material is YAG:Ce.

24. (Currently amended): The semiconductor component according to claim 17 ~~13, 25 or 26~~, wherein said luminescence conversion element has at least one inorganic luminescence material selected from the phosphor group, and wherein the inorganic luminescent material is embedded in an epoxy resin matrix.

25. (Currently amended): The semiconductor component according to claim 17 ~~13, 25 or 26~~, wherein said luminescence conversion element has at least one inorganic luminescence material selected from the phosphor group, and wherein the inorganic luminescent material is embedded in a matrix formed of inorganic glass with a relatively low melting point.

26. (Currently amended): The semiconductor component according to claim 22 ~~13, 25 or 26~~, wherein said luminescence conversion element has at least one inorganic luminescence material selected from the phosphor group, and wherein the inorganic luminescent material is embedded in an epoxy resin matrix, and wherein the inorganic luminescent material has a mean particle size of approximately 10 μm .

27. (Currently amended): The semiconductor component according to claim 1 ~~13, 25 or 26~~, wherein said luminescence conversion element is provided with a plurality of mutually

different materials selected from the group consisting of organic and inorganic luminescent materials.

28 24. (Currently amended): The semiconductor component according to claim 1 *13, 25 or 26*, wherein said luminescence conversion element includes dye molecules selected from the group consisting of organic and inorganic dye molecules partly with and partly without a wavelength conversion effect.

C 1 25. (Currently amended): A light-radiating semiconductor component, comprising: a semiconductor body emitting electromagnetic radiation during an operation of the semiconductor component, said semiconductor body having a semiconductor layer sequence suitable for emitting electromagnetic radiation of a first wavelength range selected from a spectral region consisting of ultraviolet, blue, and green;

a first electrical terminal and a second electrical terminal each electrically conductively connected to said semiconductor body;
a luminescence conversion element with at least one luminescent material, said luminescence conversion element converting a radiation originating in the first wavelength range into radiation of a second wavelength range different from the first wavelength range, such that the semiconductor component emits polychromatic radiation comprising radiation of the first wavelength range and radiation of the second wavelength range. The semiconductor component according to claim 1, wherein said luminescence conversion element is selected from the group consisting of at least one luminescence conversion layer disposed in a vicinity of said semiconductor body and a luminescence conversion encapsulation enclosing at least a part of said semiconductor body and partial regions of said first and second electrical terminals, and wherein said luminescence conversion element includes light-diffusing particles.

4 26. (Currently amended): A light-radiating semiconductor component, comprising: a semiconductor body emitting electromagnetic radiation during an operation of the semiconductor component, said semiconductor body having a semiconductor layer

sequence suitable for emitting electromagnetic radiation of a first wavelength range selected from a spectral region consisting of ultraviolet, blue, and green;

a first electrical terminal and a second electrical terminal each electrically conductively connected to said semiconductor body;

a luminescence conversion element with at least one luminescent material, said luminescence conversion element converting a radiation originating in the first wavelength range into radiation of a second wavelength range different from the first wavelength range, such that the semiconductor component emits polychromatic radiation comprising radiation of the first wavelength range and radiation of the second wavelength range. The semiconductor component according to claim 1, wherein said luminescence conversion element is selected from the group consisting of at least one luminescence conversion layer disposed in a vicinity of said semiconductor body and a luminescence conversion encapsulation enclosing at least a part of said semiconductor body and partial regions of said first and second electrical terminals, which comprises a wherein a transparent encapsulation with includes light-diffusing particles.

29
27 (Currently amended): The semiconductor component according to claim 1, 13, 25 or 26, wherein said luminescence conversion element comprises at least one luminescent 4f-organometallic compound.

28 (Currently amended): The semiconductor component according to claim 1, 13, 25 or 26, wherein said luminescence conversion element includes a luminescent material that is luminescent in a blue region.

29 (Currently amended): The semiconductor component according to claim 1, 13 which comprises a transparent encapsulation with a luminescent material that is luminescent in a blue region.

32 30. (Currently amended): A full-color LED display device, comprising a plurality of the light-radiating semiconductor components of claim + 13, 25 or 26 arranged in a full-color LED display.

33 31. (Currently amended): In an interior lighting of an aircraft cabin, a plurality of the light-radiating semiconductor components according to claim + 13, 25 or 26.

C1 34 32. (Currently amended): The combination with a display device, a plurality of the semiconductor components according to claim + 13, 25 or 26 disposed to illuminate a display of the display device.

35 33. (Currently amended): The combination with a display device, a plurality of the semiconductor components according to claim 13, 25 or 26 disposed to illuminate a display of the display device, according to claim 32, wherein said display device includes a liquid crystal display.

Claims 34-51 (Cancelled)

36 32. (New): A light-radiating semiconductor component, comprising:
a semiconductor body emitting electromagnetic radiation during an operation of the semiconductor component, said semiconductor body having a semiconductor layer sequence suitable for emitting electromagnetic radiation of a first wavelength range selected from a spectral region consisting of ultraviolet, blue, and green;
a first electrical terminal and a second electrical terminal each electrically conductively connected to said semiconductor body;
a luminescence conversion element with at least one luminescent material, said luminescence conversion element converting a radiation originating in the first wavelength range into radiation of a second wavelength range different from the first wavelength range, such that the semiconductor component emits polychromatic radiation

comprising radiation of the first wavelength range and radiation of the second wavelength range; wherein

C 356
53.

said luminescence conversion element comprising a luminescence conversion encapsulation produced from a silicone and containing inorganic luminescence material selected from the group consisting of garnets doped with rare earths, alkaline earth metal sulfides doped with rare earths, thiogallates doped with rare earths, alumimates doped with rare earths, and orthosilicates doped with rare earths.

(New): A light-radiating semiconductor component, comprising:

a semiconductor body emitting electromagnetic radiation during an operation of the semiconductor component, said semiconductor body having a semiconductor layer sequence suitable for emitting electromagnetic radiation of a first wavelength range selected from a spectral region consisting of ultraviolet, blue, and green;

a first electrical terminal and a second electrical terminal each electrically conductively connected to said semiconductor body;

a luminescence conversion element with at least one luminescent material, said luminescence conversion element converting a radiation originating in the first wavelength range into radiation of a second wavelength range different from the first wavelength range, such that the semiconductor component emits polychromatic radiation comprising radiation of the first wavelength range and radiation of the second wavelength range; and

said luminescence conversion element being formed such that the radiation of the first wavelength range passes through said luminescence conversion element along a plurality of paths, the plurality of paths having a substantially equal path length inside said luminescence conversion element, and said luminescence conversion element emitting a substantial portion of the radiation of the first wavelength range and the radiation of the second wavelength range,

wherein said luminescence conversion element is directly deposited on said semiconductor body; and

J

wherein the radiation emitted by said semiconductor body has a luminescence intensity maximum at a wavelength of or below 520 nm.

34635
34/54 (New): The semiconductor component according to claim ~~25, 26 or 53~~ wherein said luminescence conversion element is at least one luminescence conversion layer disposed in a vicinity of said semiconductor body.

34535
34/55 (New): The semiconductor component according to claim ~~25, 26, 52 or 53~~ wherein said luminescence conversion element is a luminescence conversion encapsulation enclosing at least a part of said semiconductor body and partial regions of said first and second electrical terminals.

34635
34/56 (New): The semiconductor component according to claim 1, ~~52, or 53~~ wherein said second wavelength range includes wavelengths at least some of which are longer than wavelengths of the first wavelength range.

34635
34/57 (New): The semiconductor component according to claim 1, ~~52 or 53~~ wherein said semiconductor body is adapted to emit ultraviolet radiation during operation of the semiconductor component, and said luminescence conversion element converts at least a portion of the ultraviolet radiation into visible light.

34635
34/58 (New): The semiconductor component according to claim 1, ~~52 or 53~~ wherein the first wavelength range and the second wavelength range of the polychromatic radiation lie at least partially in mutually complementary-color spectral regions, and a combination of radiation from the first and second wavelength range results in white light.

34635
34/59 (New): The semiconductor component according to claim 1, ~~52 or 53~~, wherein said luminescence conversion element converts radiation of the first wavelength range into radiation of a plurality of second wavelength ranges from mutually different spectral subregions, such that the semiconductor component emits polychromatic radiation

comprising radiation of the first wavelength range and radiation of the plurality of second wavelength ranges, wherein the first wavelength range emitted by said semiconductor body and two second wavelength ranges produce an additive color triad, such that white light is radiated by the semiconductor component during operation thereof.

47 60. (New): The semiconductor component according to claim 1, ~~52~~ or ~~53~~ wherein the radiation emitted by said semiconductor body has a luminescence intensity maximum in a blue spectral region at a wavelength between 420 nm and 460 nm.

47 61. (New): The semiconductor component according to claim 1 which further comprises an opaque base housing formed with a recess, and wherein said semiconductor body is disposed in said recess of said base housing, and including a covering layer having a luminescence conversion layer on said recess.

47 62. (New): The semiconductor component according to claim 1, ~~52~~ or ~~53~~ which further comprises an opaque base housing formed with a recess, and wherein said semiconductor body is disposed in said recess of said base housing, and wherein said recess is at least partially filled with said luminescence conversion element.

47 63. (New): The semiconductor component according to claim ~~53~~, wherein said luminescence conversion element includes organic dye molecules in a plastic matrix.

47 64. (New): The semiconductor component according to claim ~~53~~, wherein said luminescence conversion element includes organic dye molecules in a plastic matrix, and wherein said plastic matrix is formed from a plastic material selected from the group consisting of silicone, thermoplastic material, and thermosetting plastic material.

47 65. (New): The semiconductor component according to claim ~~53~~, wherein said luminescence conversion element includes organic dye molecules in a plastic matrix, and wherein said

luminescence conversion element has organic dye molecules in a matrix selected from the group consisting of an epoxy resin matrix and a polymethyl methacrylate matrix.

48. (New): The semiconductor component according to claim 52 or 53, wherein said luminescence conversion element has at least one inorganic luminescence material selected from the phosphor group.

49. (New): The semiconductor component according to claim 1, 52 or 53, wherein the inorganic luminescent material is selected from the group of Ce-doped garnets.

C 1 50. (New): The semiconductor component according to claim 1, 52 or 53, wherein the inorganic luminescent material is YAG:Ce.

51. (New): The semiconductor component according to claim 53 wherein said luminescence conversion element has at least one inorganic luminescence material selected from the phosphor group, and wherein the inorganic luminescent material is embedded in an epoxy resin matrix.

52. (New): The semiconductor component according to claim 53, wherein said luminescence conversion element has at least one inorganic luminescence material selected from the phosphor group, and wherein the inorganic luminescent material is embedded in a matrix formed of inorganic glass with a relatively low melting point.

53. (New): The semiconductor component according to claim 53, wherein said luminescence conversion element has at least one inorganic luminescence material selected from the phosphor group, and wherein the inorganic luminescent material is embedded in an epoxy resin matrix, and wherein the inorganic luminescent material has a mean particle size of approximately 10 μm .

54/72. (New): The semiconductor component according to claim 13, 25 or 26, wherein said luminescence conversion element is provided with a plurality of mutually different materials selected from the group consisting of organic and inorganic luminescent materials.

55/73. (New): The semiconductor component according to claim 52 or 53, wherein said luminescence conversion element includes dye molecules selected from the group consisting of organic and inorganic dye molecules partly with and partly without a wavelength conversion effect.

C1 56/74. (New): The semiconductor component according to claim 1, 52 or 53 wherein said luminescence conversion element comprises at least one luminescent 4f-organometallic compound.

57/75. (New): The semiconductor component according to claim 1, 52 or 53 wherein said luminescence conversion element includes a luminescent material that is luminescent in a blue region.

58/76. (New): The semiconductor component according to claim 52 or 53 which comprises a transparent encapsulation with a luminescent material that is luminescent in a blue region.

59/77. (New): A full-color LED display device, comprising a plurality of the light-radiating semiconductor components of claim 52 or 53 arranged in a full-color LED display.

60/78. (New): In an interior lighting of an aircraft cabin, a plurality of the light-radiating semiconductor components according to claim 1, 52 or 53.

61 79. (New): The combination with a display device, a plurality of the semiconductor components according to claim 1, ~~18, 25, 26~~ or ~~52~~ disposed to illuminate a display of the display device.

62 80. (New): The semiconductor component according to claim 2, wherein the first wavelength range emitted by said semiconductor body and two second wavelength ranges produce an additive color triad, such that white light is radiated by the semiconductor component during operation thereof.

63 81. (New): The semiconductor component according to claim ~~18, 25, 26~~ or ~~52~~, wherein the radiation emitted by said semiconductor body has a luminescence intensity maximum at a wavelength $\lambda \leq 520$ nm.

64 82. (New): The semiconductor component according to claim 1, wherein said luminescence conversion element comprises a plurality of layers with mutually different wavelength conversion properties.

65 83. (New): The semiconductor component according to claim 1, wherein the inorganic luminescent material has a mean particle size of approximately 10 μm .

66 84. (New): The semiconductor component according to claim 1, ~~18, 25, 26~~ or ~~52~~, wherein said luminescence conversion element includes light-diffusing particles.

67 85. (New): The semiconductor component according to claim 1, ~~18, 25, 26~~ or ~~52~~ which comprises a transparent encapsulation with light-diffusing particles.

68 86. (New): The semiconductor component according to claim 1, ~~18, 25, 26, 52~~ or ~~53~~, wherein said luminescence conversion element is surrounded by a further transparent encapsulation.

Applicant : Hohn et al.
Serial No. : 09/731,220
Filed : December 6, 2000
Page : 16

Attorney's Docket No.: 12406-
003002 / 199601650PUS02

C 69 87. (New): The combination with a display device, a plurality of the semiconductor components according to claim ~~32~~ or ~~33~~ disposed to illuminate a display of the display device, wherein said display device includes a liquid crystal display.

J